

Attorney Docket No.: SIT-0107  
Inventors: Becker et al.  
Serial No.: 09/876,238  
Filing Date: June 7, 2001  
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the wavelength range of the Ne resonance lines and the  $\text{Ne}_2^*$  second excimer continuum using an expanded intensity scale (b). The most striking observations from Figure 3(a) are the very weak intensity observed in the range of the Ne and  $\text{Ne}_2^*$  emission and the dominance of the hydrogen Lyman- $\alpha$  line at 121.6 nm. There is also a distinct Lyman- $\beta$  emission line at 102.5 nm. The expanded intensity scale in Figure 3(b) shows that all Ne/ $\text{Ne}_2^*$  emission features have been reduced considerably, particularly the second continuum. The emission of the hydrogen Lyman- $\alpha$  emission is due to a near-resonant energy transfer between the  $\text{Ne}_2^{*+}$  and the  $\text{H}_2$  molecules causing the break-up of the  $\text{H}_2$  molecule into two H atoms and the simultaneous excitation of one H atom to the  $n=2$  excited state followed by the emission of the H Lyman- $\alpha$  line at 121.6 nm when the excited H( $n=2$ ) atom decays to the  $n=1$  ground state.

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**REMARKS**

This preliminary amendment is being filed to correct typographical errors in order to facilitate the prosecution of this case. No new matter has been added by this amendment. Entry of this amendment is respectfully requested.

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Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

The paragraph beginning at page 1, line 5, has been amended as follows:

This work was supported by the United States National Science Foundation (NSF) under awards PHY-9722438 and PHY-9986692 ~~PHY-9722438~~, ECS-98033997, and CTS-0078618; and by the U.S. Defense Advanced Research Projects Agency (DARPA) under contract DAAD19-99-1-0277. The U.S. Government has certain rights in this invention.

The paragraph beginning at page 7, line 30, has been amended as follows:

Another embodiment of the present invention provides a method of generating intense hydrogen Lyman- ~~$\alpha$~~  or Lyman- $\beta$  emissions or atomic oxygen and nitrogen emissions in the spectral range from 100 nm to 150 nm by placing the MHC discharge device into a sealed container which contains a high pressure gas or high pressure gas mixture. The high pressure gas mixture may be stagnant or may be flowed through the hole(s) in the MHC

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discharge device. Figure 3 shows emission spectra from a MHC discharge operated in high-pressure Ne with a small admixture of  $H_2$  at 0.5 Torr. Two figures are shown, a scan covering the entire wavelength range from 70 to 125 nm (a) and a scan covering the wavelength range of the Ne resonance lines and the  $Ne_2^*$  second excimer continuum using an expanded intensity scale (b). The most striking observations from Figure 3(a) are the very weak intensity observed in the range of the Ne and  $Ne_2^*$  emission and the dominance of the hydrogen Lyman- $\alpha$  line at 121.6 nm. There is also a distinct Lyman- $\beta$  emission line at 102.5 nm. The expanded intensity scale in Figure 3(b) shows that all Ne/ $Ne_2^*$  emission features have been reduced considerably, particularly the second continuum. The emission of the hydrogen Lyman- $\alpha$  emission is due to a near-resonant energy transfer between the  $Ne_2^{++}$  and the  $H_2$  molecules causing the break-up of the  $H_2$  molecule into two H atoms and the simultaneous excitation of one H atom to the  $n=2$  excited state followed by the emission of the H Lyman- $\alpha$  line at 121.6 nm when the excited H( $n=2$ ) atom decays to the  $n=1$  ground state.